DECLARATION

Applicant: Atsushi FUKUI et al.
Application No.: 10/815,976 Group Art Unit: 1795
Filing Date: April 2, 2004 Examiner: Thanh-truc TRINH
Title: Dye-Sensitized Solar Cell and Manufacturing Method Thereof

DECLARATION PURSUANT TO 37 C.F.R. 1.132

1. I, Atsushi FUKUI, hereby declare that:

I am one of inventors of the above-identified U.S. application;

I graduated in 2001 from Doctor of Philosophy in Engineering, Department of Applied Physics, Graduate School of Engineering, Osaka University in Japan;

I have been employed by SHARP KABUSHIKI KAISHA since 2001, where I am involved in a research work of Dye-Sensitized Solar Cell; and

I am aware that the above-identified U.S. application has been rejected over US 2002/0040728 (hereinafter referred to as "Yoshikawa").

2. A dye-sensitized solar cell was manufactured as follows, and experimental tests were carried out in order to evaluate properties of the dye-sensitized solar cell and to verify that an absorbance peak of a porous semiconductor layer of the present invention adsorbing a dye sensitizer is located on a shorter wavelength side than an absorbance peak of a porous semiconductor layer observed immediately after adsorption of a dye sensitizer by a chemical treatment with use of an acetonitrile solution of dimethylpropylimidazolium iodide (DMPII) and that an absorbance peak of a porous semiconductor layer of Yoshikawa adsorbing a dye sensitizer is not located on a shorter wavelength side due to a chemical treatment (described as "aftertreatment" in Yoshikawa) with use of an acetonitrile solution of t-butyl pyridine (TBP).

The dye-sensitized solar cell of the present invention was manufactured in accordance with Example 1 recited on page 18, line 10 to page 20, line 23 of the present specification, except that cis-bis(isothiocyanato)bis-(2,2'-bipyridyl-4,4'-dicarboxylato)ruthenium(II) (trade name: Ruthenium 535, made by Solaronix Co. in Switzerland) was used as the dye sensitizer and solutions described below were used for treating the porous semiconductor layer adsorbing the dye sensitizer (TiO_2 electrode).

Solutions for Treating the Porous Semiconductor Layer

Experiment 1:

acetonitrile (made by Kishida Chemical Co., Ltd. in Japan) solution of 0.2 M dimethylpropylimidazolium iodide (made by Shikoku Corp. in Japan) (hereinafter referred to as "0.2M DMPII")

Comparative Experiment 1:

acetonitrile (made by Kishida Chemical Co., Ltd. in Japan) solution of 0.2 M t-butyl pyridine (made by Aldrich, Inc.) (hereinafter referred to as "0.2M TBP")

Comparative Experiment 2:

untreated (blank) (hereinafter referred to as "N3")

Results thereby obtained are shown in Fig. A and Table A below.

Fig. A and Table A each shows absorbance profiles, wavelengths (nm) of absorbance peaks, and shift amounts (nm) that show differences between 0.2M DMPII of Experiment 1 and 0.2M TBP of Comparative Experiment 1, and N3 of Comparative Experiment 2.

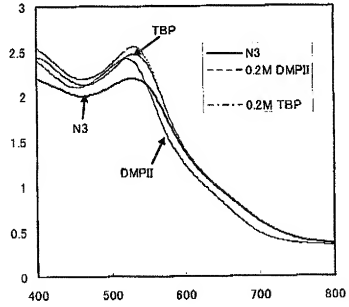

Fig. 1

Table A

	solution for treating porous semiconductor layer	wavelength of absorbance peak (nm)	shift amount toward shorter wavelength side (nm)
Experiment 1	0.2M DMPII	522	11
Comparative Experiment 1	0.2M TBP	531	2
Comparative Experiment 2	N3 (blank)	533	-

3. Conclusion

According to the results shown in Fig. A and Table A, an absorbance peak of a porous semiconductor layer of Experiment 1 which was treated with the 0.2M DMPII of the present invention was found to be shifted by about 10 nm on the shorter wavelength side relative to N3 (i.e., blank) of Comparative Experiment 2. (Note: ±2 nm is a range of a measurement deviation.)

On the other hand, Yoshikawa discloses in Paragraph [0193] as follows. As shown in Table 1 in Paragraph [0193], an absorbance peak of a porous semiconductor layer (see Comparative Experiment 1) treated with TBP as an additive of a treatment liquid of Example 1 is not located on a shorter wavelength side relative to N3 (i.e., blank) of Comparative Experiment 2.

Namely, it was found that the absorbance peak of the porous semiconductor layer of a dye-sensitized solar cell of Yoshikawa adsorbing the dye sensitizer is not located on the shorter wavelength side than an absorbance peak of a porous semiconductor layer observed immediately after adsorption of a dye sensitizer.

Accordingly, the absorbance peak of the porous semiconductor layer of the present invention adsorbing the dye sensitizer is located on the shorter wavelength side than the absorbance peak of the porous semiconductor layer observed immediately after the adsorption of the dye sensitizer, so that the present invention can provide the dye-sensitized solar cell that has a high open-circuit voltage and a high photoelectric conversion efficiency but decreases a leak current.

4. It is declared by the undersigned that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signed this November 20, 2009

Atsushi FUKUI

Atsushi FUKUI